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Pediatric Pain Management during Intravenous Line Placement: Nursing Perceptions and Interventions

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HONORS PROGRAM

This thesis, written under the direction of the candidate's thesis advisor and approved by the program chair, has been presented to and accepted by the Department of Nursing in partial fulfillment of the requirements for the degree of Bachelor of Science. An electronic copy of of the original signature page is kept on file with the Archbishop Alemany Library.

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By

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Submitted in partial fulfillment of the requirements of the Department of Nursing and the Honors Program
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Acknowledgements

I would like to thank Bwindi Community Hospital in Uganda for providing me with the opportunity to learn about and care for the children of Bwindi. My experience caring for acutely ill children in Uganda has inspired this research. I would also like to thank my parents for challenging and empowering me to grow in love and leadership so that I may fully embrace my role as a healthcare professional.

Abstract

Children are under assessed and under treated for pain associated with medical procedures, specifically during venipuncture. Recent studies show that procedural pain is preventable and that pain management interventions are underutilized. Failure to provide adequate pain relief can mentally and physically hurt children - in addition to inducing fear, suffering and lack of trust, exposures to pain can alter the central nervous system and increase a child's sensitivity to pain. Pediatric nurses are responsible for assessing and managing pain before, during and after a procedure. Therefore, this review of literature and pilot study examines how registered nurses practicing in the acute care setting manage pain with pharmacological and nonpharmacological interventions across the pediatric developmental spectrum during venipuncture. This quantitative descriptive exploratory pilot study was guided by the Kolcaba theory of comfort which focuses on holistic care and considers all dimensions of an individual when addressing discomfort. Based on this theory, a quantitative survey was created to obtain information regarding nurses' perceptions and interventions related to pediatric venipuncture. Seven nurses participated be completing the survey. The literature review and pilot study reveal how nurses currently manage pain and how nursing care and pediatric procedural pain management can be improved.

Introduction

Pediatric patients undergoing procedures in the acute care setting are not always effectively treated for pain. Pain can be controlled and sometimes avoided with correct pharmacological and nonpharmacological interventions. However, not all children receive the correct amount or type of pain relieving interventions. Past research has shown that the two age groups that have historically received the least amount of pain management have been the very old and the very young. For example, within an international perspective, at the Bwindi Community Hospital in Uganda children underwent painful procedures such as wound debridement without any pain relieving interventions - even though pharmacological and nonpharmacological resources were available. Pediatric nurses hold great responsibility in anticipating and recognizing pain in children and subsequently determining appropriate assessment tools, interventions, continued management and re-evaluation of interventions used.

Problem Statement

Many children are not effectively treated for pain related to procedures in the acute care setting. Despite available resources and research, children continue to be under assessed and under treated for pain associated with medical procedures (Bice, 2014)**.** A recent study by Bernie (2014) surveyed over 100 children, ages 3 weeks to 18 years, and their families in four hospitals in Canada and found that 94% of the children experienced pain within the past 24 hours of their hospital stay. Of the 94%, only 66% were given pharmacological pain relief. The study also found that the younger age correlated with less pain assessments and interventions for the child. The study suggested that procedural pain is preventable and that pain management interventions are underutilized (Birnie, 2014).

The World Health Organization states that access to pain relief is a basic human right (Lohman, 2010). Additionally, the American Society for Pain Management Nursing asserts that every person has the right to optimal pain management before, during, and after a potentially painful or stressful procedure (Czarnecki, 2011). Failure to provide adequate pain relief can mentally and physically hurt children - in addition to inducing fear, suffering and lack of trust, exposures to pain can alter the central nervous system and increase a child's sensitivity to pain (Marshall, 2018).

Nurses must manage a variety of patient symptoms, pain being one of the most crucial. Pediatric nurses are directly responsible for anticipating, recognizing and evaluating pain and subsequently implementing necessary interventions before, during and after procedures. Pharmacological and nonpharmacological pain management resources are usually available, however, not all nurses may use, be aware of, or have the knowledge to utilize these resources. Therefore, the aim of this study is to investigate how nurses currently utilize pharmacological and nonpharmacological interventions to manage pain before, during, and after procedures for pediatric patients. The research question for this study is: Which pharmacological and nonpharmacological interventions have been found to be most effective in the management of procedural pain in the pediatric population?

Purpose Statement

Therefore, the aim of this study is to investigate how nurses currently utilize pharmacological and nonpharmacological interventions to manage pain before, during, and after procedures for pediatric patients.

Research Question

The research question for this study is: Which pharmacological and non-pharmacological interventions are the most effective and most commonly used to manage procedural pain in the pediatric population?

Literature Review

The following literature review addresses recent information regarding the types of nursing practices surrounding pediatric pharmacological and nonpharmacological pain management. The reviewed literature was retrieved from the following databases: CINAHL, Iceberg and Google Scholar. Ten articles were reviewed under the following subheadings: Pain experience and assessment, pharmacological interventions, nonpharmacological interventions, pediatric considerations and implications for nursing practice.

Pain Experience and Assessment

The article, *Pediatric Pain Measurement, Assessment, and Evaluation* by Manworren (2016) explores various definitions, characteristics, and assessments of pain specific to the pediatric population. Manworren states that pain is a biopsychosocial phenomenon that depends on sensation, emotions, behavior, development, spirituality, and culture. A pain sensation can represent potential or actual tissue damage. Each pain experience should be viewed and treated as a valid and real event.

Different types of pain require specific assessments and interventions. Pain can be acute, chronic, or a combination. Acute pain is generally immediate and short-lived whereas chronic pain is persistent and occurs for three or more months. Medical procedures such as venipuncture and wound debridement usually cause acute pain. Pain sensation can be neuropathic or nociceptive. Neuropathic pain is caused by nervous system damage. Whereas nociceptive pain

occurs with actual or potential damage to non neural tissues. Nociceptive pain can be somatic, involving external organs and the musculoskeletal system, or visceral, affecting internal organs (Manworren, 2016).

Similarly, Beecham's (2013) study, *Pharmacological interventions for pain for life-limiting conditions in children and adolescents*, describes four ways of characterizing pain: Nociceptive versus neuropathic, intensity, temporality, and location. Nociceptive pain occurs with direct tissue injury whereas neuropathic pain is caused by injury or malfunction of the nervous system. Pain intensity refers to the objective and subjective spain level scoring. Intensity can be determined by pain scales ranging from 0 to 10 or pain diagrams displaying pictures of pain levels. Objective assessments such as vital signs can also provide information about intensity. Temporality refers to the timing of pain such as acute versus chronic and episodic versus recurrent pain. Location describes the exact area and radiation of the pain sensation.

Manworren asserts that a multidimensional pain assessment should include: Pain intensity, location, duration, quality, perception, emotional response, and pain influencers. To effectively assess pain in children, health care providers should: Take a pain history, assess the child's pain with an appropriate tool, and reassess the child after initiating interventions. Various pain assessment tools are available to address different developmental ages, types of pain, and pain associated symptoms. However, of the thirty self-reporting pain intensity assessments, only six have evident reliability, validity, and feasibility (Manworren, 2016).

Pharmacological Interventions

The article *Pain management in the acute care setting: Update and debates* by Palmer (2016) focuses on the use of pharmacological pain management options commonly administered pediatric patients in acute pain. Some of theses medications include: Non-steroidal anti

inflammatory drugs, nonopioid analgesics, opioid analgesics, anesthetics and other medications such as tramadol and benzodiazepines. Medications are administered to children based on the child's condition, suspected need, possible side effects, and present contraindications. Palmer suggests that pediatric health care professionals need increased awareness and knowledge of pharmacological management of pediatric pain (Palmer, 2016).

Beecham (2015) described four main categories of pediatric pharmacological pain management: Non-opioid analgesics, opioid analgesics, local anesthetics, and adjuvant analgesics. Non-steroidal anti-inflammatory medications, such as acetaminophen, are considered non-opioid analgesics and are of the most common pain-relieving drugs administered to children. Opioid analgesics, such as morphine, are not as commonly used. Interestingly, Beechman states that children receiving an opioid may need higher and more frequent dosing compared to adults because children can metabolize opioids quickly. For localized pain, local anesthetics such as lidocaine patches may be effective. Finally, adjunct analgesics are medications not specifically indicated for pain relief but may help with other symptoms contributing to the child's pain. Examples of adjunct analgesics include anticonvulsants, antidepressants, and muscle relaxants (Beechman, 2015).

The randomized factorial study - *Mitigating procedural pain during venipuncture in a pediatric population* by Bahorski (2015) studied the implications of child age, sex, and ethnicity on acute pain perception and response to pain relieving measures. One of the pain reducing measures tested was a topical Lidocaine cream. This noninvasive pharmacological intervention was effective in relieving pain in most children but was no more effective than other nonpharmacological techniques such as the Buzzy Bee ® vibration and cooling device. This

suggests that other modes of pain relief should be considered before and during the administration of pain-relieving medications (Bahorski, 2015).

Nonpharmacological Interventions

Palmer's article described some modes of age-specific nonpharmacological pain management interventions. For infants, Palmer mentions oral sucrose and non-nutritive sucking as effective comforting measure. For infants through older children Palmer states that thermotherapy, positioning, vibration, districation and hypnosis may helpful in alleviating pain and associated sensations. (Palmer, 2016).

Non-pharmacological interventions across the developmental spectrum are described by Short (2013) in the article, *Nonpharmacologic Techniques to Assist in Pediatric Pain Management*. Short groups non-pharmacological pain treatments into four categories: Behavioral, cognitive, complementary and physical. These interventions can be applied to the following four age groups: Infant, toddler and preschool, school-aged, and adolescent. The four types of interventions can be applied to each age group; however, specific treatments will vary depending on the developmental and actual age of the child. Examples of behavioral interventions include parent presence and positive encouragement. Cognitive interventions range from distraction to self-coping statements. Music, medical play, and therapeutic art are complementary methods. And non-nutritive sucking, positioning, deep breathing, and heat-cold therapy are physical interventions. These therapies combined with medical and pharmacological interventions can help mitigate a child's acute or chronic pain experience (Short, 2013).

Katende's (2015) study, *Comforting strategies and perceived barriers to pediatric pain management during IV line insertion procedure in Uganda's national referral hospital: A descriptive study* addressed how nurses in Uganda manage pain associated with intravenous line

insertion in children. Despite the limited resource environment, the study suggested that rural areas such as Uganda have great capability to provide effective non-pharmacological pain relief. The following pain relieving measures were examined: Greeting the family, having the child suck their finger, maternal-child skin-to-skin contact, breastfeeding, swaddling, distraction, positioning, verbal consent and explanation and play preparation. Parental presence and involvement were found to be effective in reducing the stress and pain related to the procedure (Katende, 2015).

A randomized controlled trial conducted by Bergomi (2018) that observed the *Efficacy of Non-pharmacological Methods of Pain Management in Children Undergoing Venipuncture in a Pediatric Outpatient Clinic* suggested a combination of multiple comforting measures provides the best pain relief. The trial of 150 children aged five to twelve years found that watching animated cartoons while having parental support provided the best form of nonpharmacological acute pain relief during venipuncture. The study tested other distraction techniques such as the Buzzy Bee ® tool and combined Buzzy Bee ® and animated cartoon viewing. Buzzy Bee ® is a plastic device that wraps around the patient's arm above the site of intended venipuncture. The device vibrates and cools the skin with attached ice packs. Buzzy Bee ® showed to be effective only for children ages five to nine. And the combination of Buzzy Bee ® with viewing animated cartoons provided less pain relief than watching cartoons. The distraction methods chosen for this study were based on the Gate Control Theory. The Gate Control Theory suggests that the perception of pain can be altered or decreased by interrupting the nociceptive pathways with other sensations (Bergoni, 2018).

Pediatric Considerations

In her article Palmer (2016) noted that the effectiveness of pain management techniques greatly depends on the physical and developmental stage of the child. Palmer stresses the importance of recognizing and assessing the developmental stage of the child before choosing and implementing any pain management interventions (Palmer, 2016). Similarly, Bergomi (2018) references that pediatric pain assessment is especially unique and challenging because a child's perception, understanding and ability to communicate pain largely depends on their cognitive and overall development.

The article by Short (2013) organized non-pharmacological pain relieving techniques by appropriate age group. Common interventions for infants include distraction with interactive toys, music therapy, calming environment, nonnutritive sucking, and swaddling. Interventions are generally more effective with parental involvement. Toddlers and preschoolers may respond positively to desensitization and familiarization with medical equipment before procedures through play therapy. Distraction, music therapy, therapeutic art, positioning, and deep breathing may also benefit the toddler or preschool-aged child. Older children in grade school may also benefit from distraction, medical play, and deep breathing. Additionally, school-aged children can respond to guided imagery, thermal therapy, and vibration. Independence is a key value to adolescents, so it is important to engage the adolescent child when selecting their preferred pain relief methods. As with school-aged children, guided imagery, distraction, and music can be effective methods for older children. However, informative procedure preparation and positive self talk are effective pain relieving techniques unique to adolescents (Short, 2013).

Implications for Nursing Practice

In order to properly care for a patient's pain, the nurse must properly assess and understand the pain characteristics. Different types of pain require different treatments. A child may experience an array of pain characteristics and require unique interventions - the nurse's knowledge and assessment of the pain is crucial to effective treatment (Beecham, 2015).

The article, *Relationship between knowledge, attitudes, and self-efficacy for nurses in the management of pediatric pain* by Stanley (2013) described how nurses view and think about pediatric pain management. Twenty five nurses were asked to complete a two questionnaires: Pediatric Nurses' Knowledge and Attitudes Survey Regarding Pain, known as PNKAS, and Nurses' Self-Efficacy in Managing Children's Pain. It was found that higher scores on the PNKAS correlated with increased years of nursing experience and membership a professional healthcare organization. It was also discovered that nurses with associate degrees had high self-efficacy, but low knowledge as compared to bachelor degree nurses who had lower self-efficacy but a higher level of knowledge. The study concluded that feeling overly confident in one's knowledge can lead to poor pain management. The research also determined that pediatric nurses need more education regarding pain identification and management (Stanley, 2013).

Katende's (2015) study identified multiple limitations and barriers to nursing care directed towards pain management. Nurses in Uganda stated that limited resources, lack of time, emergent situations, poor child behavior, lack of knowledge and personal attitudes contributed to ineffective procedural pain management. The study concluded that all healthcare professionals, in addition to nurses, need more education surrounding pediatric procedural pain management (Katende, 2015).

The study, *Exploration of nurse's pediatric pain management experiences in rural hospitals: A qualitative descriptive study* by Marshal (2018) described challenges nurses may face when managing pain in children. In order to effectively manage pain nurses must correctly assess, collaborate with the care team, and implement interventions. Inadequacy in any of these three nursing responsibilities can produce less than desirable patient outcomes. The main barriers to pain management that this study identified were: institutional flaws, lack of resources, and lack of staff education. Institutional flaws such as not prioritizing pain management, lack of standard protocols, and poor communication and leadership contribute to the lack of appropriate pain management. The lack of financial, material, staff, and educational resources also has an impact. Lack of specific pain management education was found to especially contribute to poor pediatric pain management (Marshall, 2018).

At Lucile Packard Children's Hospital Stanford, Staveski (2017) led the study, *Interprofessional team's perception of care delivery after implementation of a pediatric pain and sedation protocol*. This study was conducted to address concerns of substandard and inconsistent pain management in the pediatric cardiac intensive care unit. Staveski's team implemented a protocol developed by the American College of Critical Care Medicine to manage pain, agitation, and delirium. All healthcare staff were encouraged to follow the protocol. After the implementation of the protocol, four areas of improvement were noted: consistency in using the pain, agitation, and delirium treatment guidelines, open interprofessional communication, enhanced pain management knowledge and improved provider treatment and performance. The use of a collaborative and standardized protocol improved the effectiveness of the health care team and thus patient care (Staveski, 2017).

Conclusion

This review demonstrated the knowledge currently available on pharmacological and non-pharmacological pain management options and attitudes in the pediatric population. There are many pain management interventions available. The literature reviewed suggests that the most effective form of acute pediatric pain reduction requires a combination of pain relieving factors. The most common and successful form of combined pain relief found in the literature was parent involvement combined with some form of distraction such as watching television. Local pharmacological pain relief, such as Lidocaine, was found to be effective but no more effective than non pharmacological interventions. The nurse must consider pediatric factors such as age, developmental stage and the patient's condition to provide effective pain relief. Proper assessment, timely interventions, reassessment, and multidisciplinary teamwork is crucial to providing a child excellent comfort care.

Theoretical Framework

The theoretical framework guiding this research is Kolcaba's Theory of Comfort. Katharine Kolcaba developed the theory of comfort in 1994 to clarify and emphasize the nursing role in preventing and treating patient discomfort. Kolcaba's theory uses a holistic care approach that consider all aspects of the patient when assessing the causes of their discomfort. Kolcaba states that there are three forms of comfort: Relief, ease and transcendence. Relief of discomfort occurs when the patient's immediate needs are met. Ease follows patient contentment such as decreased anxiety. And transcendence occurs when the patient conquers the challenge of discomfort. Kolcaba suggests that comfort extends across the physical, psychospiritual, environmental and sociocultural contexts of a patient. Considering these four contexts when providing care allows the nurse to view the patient as a complex and holistic individual. Finally,

Kolcaba suggests a model to guide nurses in effectively obtaining and maintaining patient comfort. Similar to the traditional nursing process, Kolcaba's model of comfort nursing care includes: Objective and subjective patient assessment, plan development, care implementation, and intervention evaluation. This model allows nurses to effectively identify and treat patients experiencing the complexities of discomfort (Kolcaba, 1994).

Kolcaba's theory of comfort is especially relevant to the acutely ill pediatric population. Kolcaba's emphasis on holistic care is exemplified in this study as the focus of this research is the combination of pharmacological and nonpharmacological interventions to manage acute pediatric pain. Nurse's perceptions of a child's perceived or actual pain determine how the nurse responds to the child's discomfort. Kolcaba's model of nursing care is crucial to understanding how nurses think and act when confronted with a child who could or is experiencing pain. Pain is a complex, individual experience that may require multiple interventions. This idea is supported by Kolcaba's theory that comfort affects all aspects of the individual - physical, psychospiritual, environmental and sociocultural. This study views pain as a complex issue requiring holistic and comprehensive nursing care. Kolcaba's theory of comfort sets the standard for the nursing care required to prevent, treat and manage pain (Kolcaba, 1994).

Kolcaba's theory of comfort provides a comprehensive view of the complexity of pain. Nurses are responsible for identifying and implementing appropriate pain management interventions. While Kolcaba's theory supports the topic of nonpharmacological and pharmacological nursing interventions in managing pediatric pain, more research is still needed in this field of study and practice.

Methods

Research Question

The literature review displayed some the of effective pharmacological and nonpharmacological interventions for managing pediatric procedural pain. With the knowledge of pain management accumulated from the literature review, a study is proposed to answer the question: How do registered nurses working in the acute care setting manage pain across the developmental spectrum, neonate to adolescent, during venipuncture in pediatric patients? Specifically, what are the most commonly used interventions and how effective do nurses perceive these interventions to be?

Study Design

This exploratory pilot study gathered preliminary information which can potentially be applied to more extensive studies regarding pediatric procedural pain management. The quantitative descriptive design of this study was achieved through the survey tool that uses numerical Likert scales to record responses to subjective and objective questions.

Population

The population of this study included all pediatric registered nurses who perform intravenous line placement for children in acute hospital care settings. Non-nursing health care providers and health care personnel who perform venipuncture on adult clients were not included in the population. Due to the limits of a pilot study, this study does not accurately represent the population.

Subjects

Subjects were included based on the following criteria: Holds a current unrestricted registered nursing license and performs venipuncture on children in an acute care setting.

Subjects with an expired or revoked nursing license were excluded from the data collection. Additionally, nurses who do not perform venipuncture or who do not care for pediatric clients were excluded. Subject participation in the research and survey was completely voluntary. A notice at the beginning of the survey stated that participation was voluntary, anonymous, and that participation could be withdrawn at any time. Additionally, the contact information of the researcher and the primary research advisor were given to all participants should any questions or concerns arise during participation.

Sample Size

The goal for this pilot study was to receive fifteen to thirty completed surveys from eligible subjects. However, only seven responses were collected. Nurses who completed the survey but who do not meet the eligibility criteria will be excluded from the data collection.

Sampling Procedures

Subjects were selected via non-probability convenience sampling. An email was sent to all pediatric nurses who were current and expired members of the Rho Alpha chapter of the honors society, Sigma Theta Tau International, to request participation in this research. Additionally, emails were sent to specific pediatric nursing faculty members at Dominican University. Snow ball sampling was encouraged; each email sent to potential participants stated that the link to the survey could be copied and shared. The survey was sent in an email as link.

Operational Definitions

Pharmacological: Interventions having to do with medications and drugs to obtain specific physiological effects

Non-pharmacological: Interventions without medications or drugs to obtain certain physiological and psychological effects

Pediatrics: healthcare specialty focused on the care of children

Child: individual ranging from the actual age of 0 - 18 years old, or as otherwise specified by the healthcare institution.

Pain: Pain is whatever the patient says it is, happening when and wherever the patient says.

Procedure: Any invasive or non-invasive medical intervention involving direct patient contact.

Venipuncture: medical procedure where a vein is punctured with a needle in order to draw blood out of the vein or administer a substance through the vein.

Buzzy Bee ® : An FDA approved device that can wrap around an extremity and vibrate. Ice packs can be attached to the device thus providing vibration and cold therapy simultaneously.

Instrument

A survey designed by the researcher was used to collect data. The survey includes demographic information and thirty-nine questions regarding nursing perceptions and interventions related to pediatric venipuncture. The demographic questions included: Age, gender, nursing license, total years holding nursing license, highest degree awarded, current workplace, hours worked per week, nursing specialty, nursing unit of work, and level of pain management education. Subjects rated their answers to each question on a Likert scale from zero to five. Zero being “never” and four being “always”. See Appendix A for the survey template. The survey was developed using Google Forms within the researcher’s private, secured Google account. The survey was anonymous and no identifying information of the participants was collected or stored. The survey was approved by the Dominican University of California Institutional Review Board.

Validity

The instrument was designed to provide appropriate data to answer the research question. Three PhD level nurses reviewed and approved this study, paper, and instrument thus providing content validity.

Reliability

Since this was a pilot study, an alpha coefficient to affirm reliability was not performed.

Step by Step Procedures

Procedure one.

This study was submitted to the Institutional Review Board at Dominican University of California and was approved.

Procedure two.

The correspondent of the Rho Alpha Chapter of Sigma Theta Tau International was contacted and was asked to email the members of the Rho Alpha Chapter to inform the members of the research study and provide a link to the digital survey. An email was sent to the current and past member of Rho Alpha with a link to the survey.

Procedure three.

Pediatric nursing faculty at Dominican University were specifically contacted by the researcher and emailed a link to the survey.

Procedure four.

Data gathered from the electronic surveys was inputted into a secure Google Pages spread sheet. Data was kept for a maximum of four months until being permanently deleted. Only the researcher and the faculty advisors had access to the raw data.

Procedure five.

The data was analyzed and interpreted by the researcher. The Google Pages spread sheet was used to analyze and equate data.

Procedure six.

Based on the data analysis and prior literature review, conclusions were made by the researcher with guidance from the faculty advisors.

Procedure seven.

Research and conclusions were disseminated through two oral presentations at conferences: The National Conference of Undergraduate Research, 2019 and the Scholarly and Creative Works Conference, 2019.

Statistical Analysis

Results

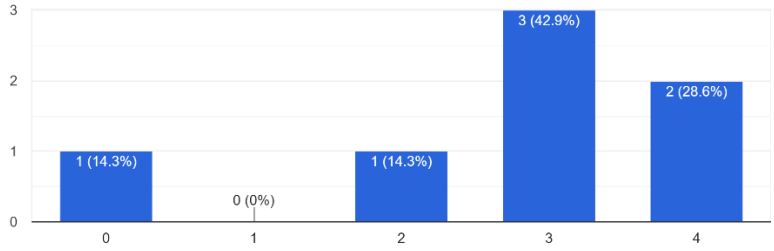
Demographics

Age	Gender	Total years holding nursing license	Highest degree awarded
58	Female	32	Doctorate
59	Female	38	Associate
31	Female	10	Bachelor
54	Female	30	Master
54	Female	30	Master
24	Female	1	Bachelor
	Female	9	Bachelor

Nursing Perceptions

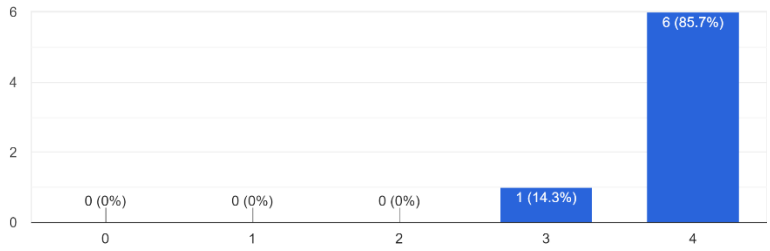
How much education have you received regarding pediatric procedural pain management?

7 responses



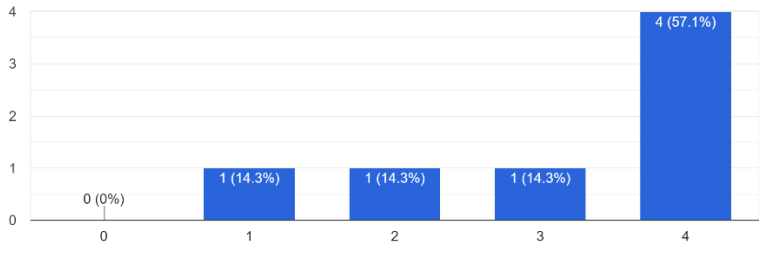
How important do you believe it is to manage a child's pain during IV placement?

7 responses



Do you have time to implement pain reliving measures before and during IV placement?

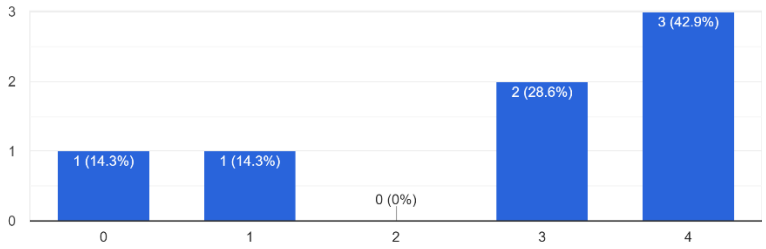
7 responses



Neonates and infants

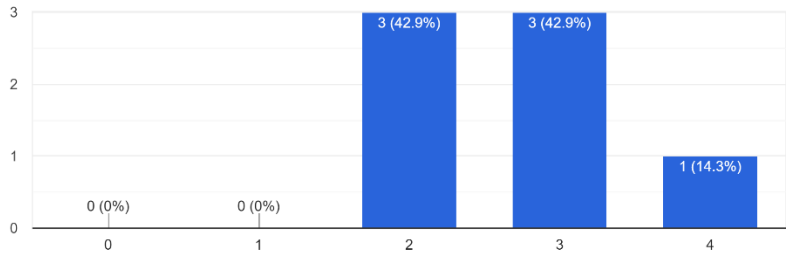
How often do you perform IV placement on neonates and infants?

7 responses



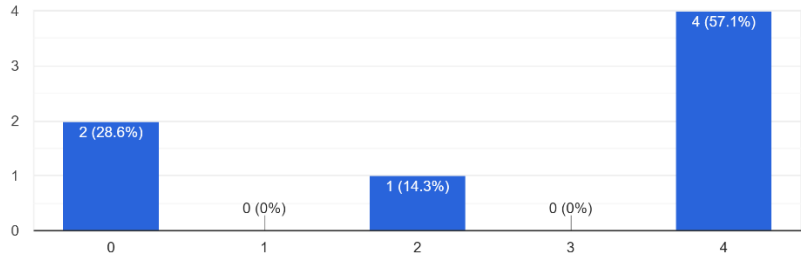
How much pain do you believe neonates and infants experience during IV placement?

7 responses



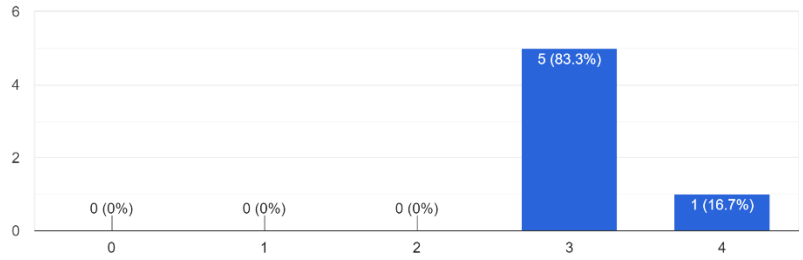
How often do you administer prescribed pharmacological pain relief to infants and neonates before IV placement?

7 responses



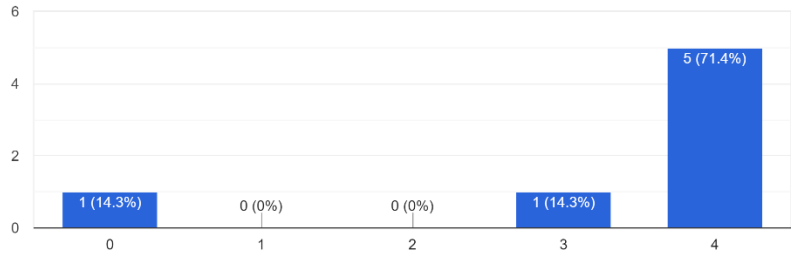
How effective do you perceive pharmacological interventions to be for managing neonatal and infant IV placement pain?

6 responses



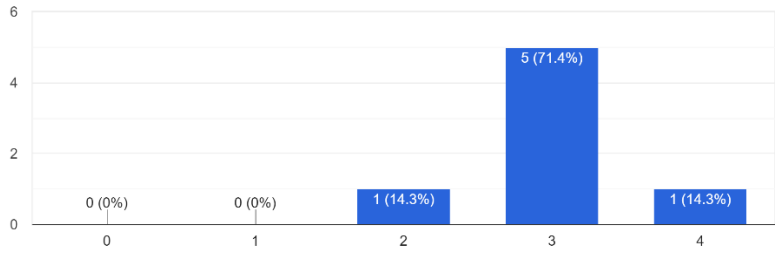
How often do you institute nonpharmacological techniques to manage neonatal and infant IV placement pain?

7 responses



How effective do you perceive nonpharmacological interventions to be for managing neonatal and infant pain?

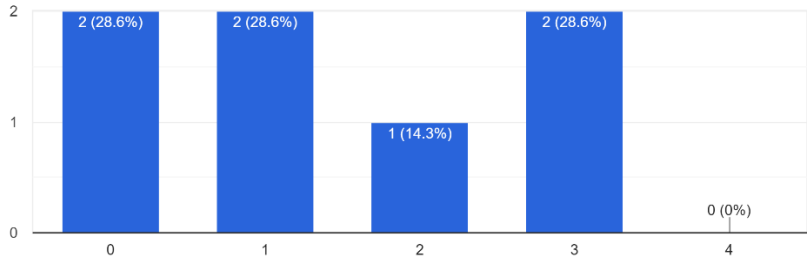
7 responses



Toddlers and preschoolers

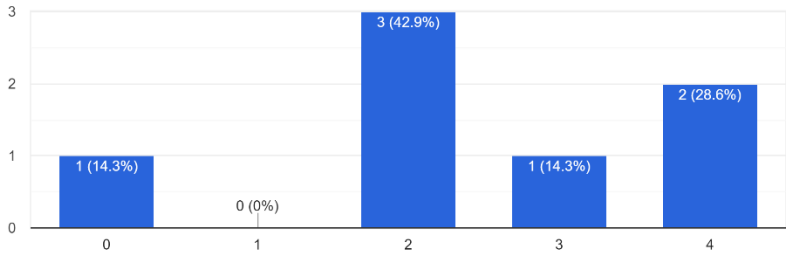
How often do you preform IV placement on toddlers and preschoolers?

7 responses



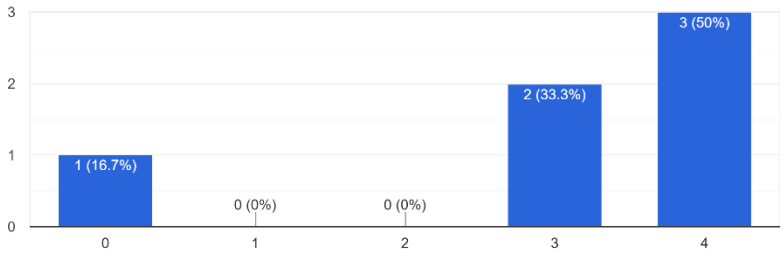
How much pain do you believe toddlers and preschoolers experience during IV placement?

7 responses



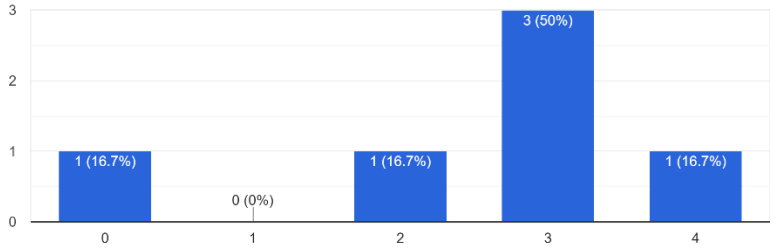
How often do you administered prescribed pharmacological pain relief to toddlers and preschoolers before IV placement?

6 responses



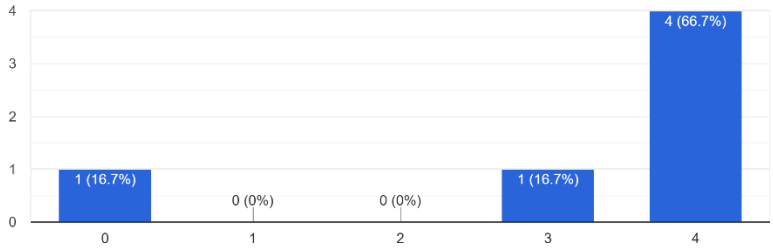
How effective do you perceive pharmacological interventions to be for managing toddler and preschooler IV placement pain?

6 responses



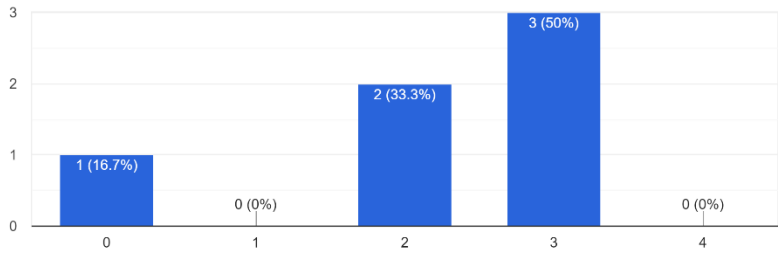
How often do you institute nonpharmacological techniques to manage toddler and preschooler IV placement pain?

6 responses



How effective do you perceive nonpharmacological interventions to be for managing toddler and preschooler IV placement pain?

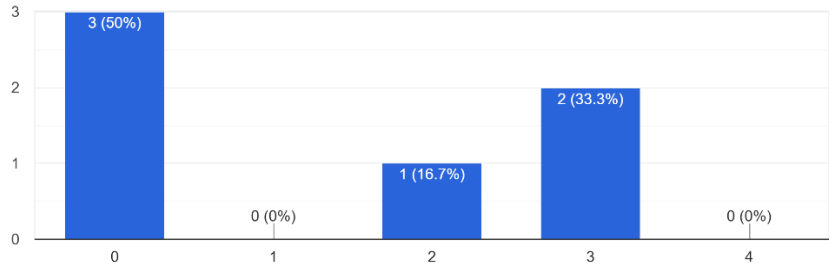
6 responses



School-aged children

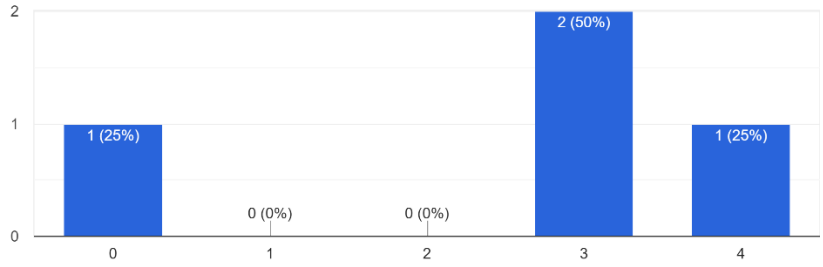
How often do you perform IV placement on school-aged children?

6 responses



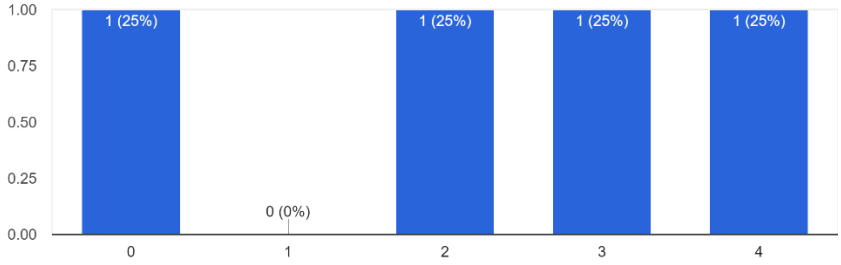
How much pain do you believe school-aged children experience during IV placement?

4 responses



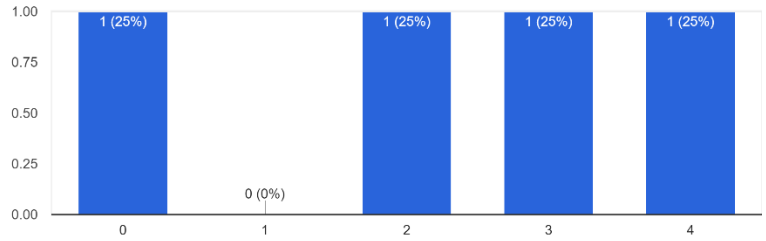
How often do you administer prescribed pharmacological pain relief to school-aged children before venipuncture?

4 responses



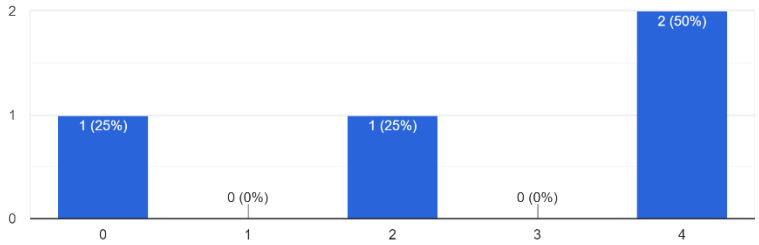
How effective do you perceive pharmacological interventions to be for managing the school-aged child's IV placement pain?

4 responses



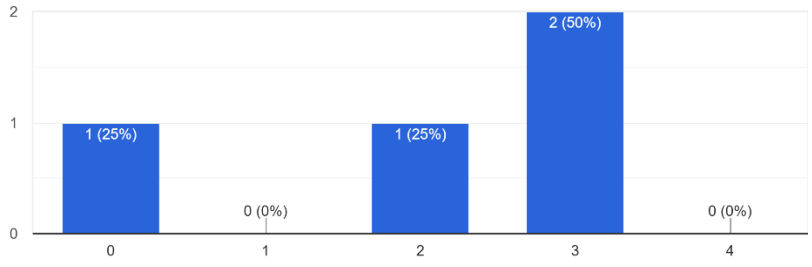
How often do you institute nonpharmacological techniques to manage the school-age child's IV placement pain?

4 responses



How effective do you perceive nonpharmacological interventions to be for managing the school-aged child's IV placement pain?

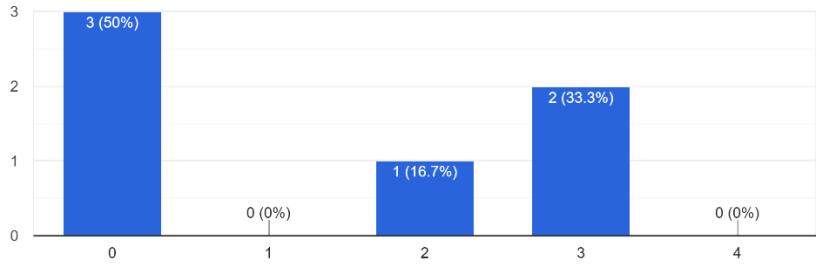
4 responses



Adolescents.

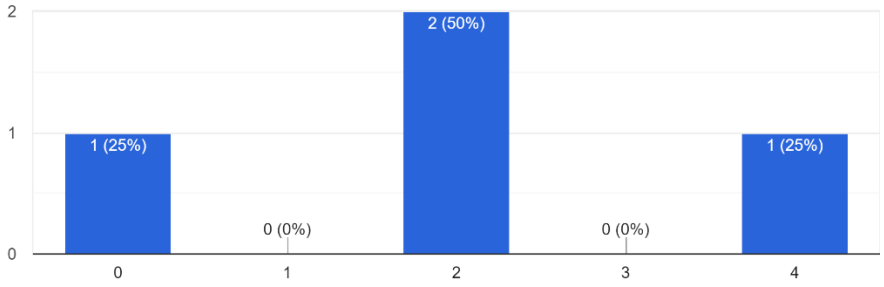
How often do you perform IV placement on adolescents?

6 responses



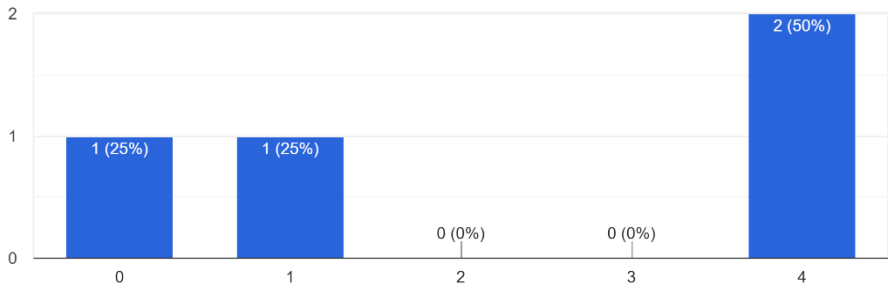
How much pain do you believe adolescents experience during IV placement?

4 responses



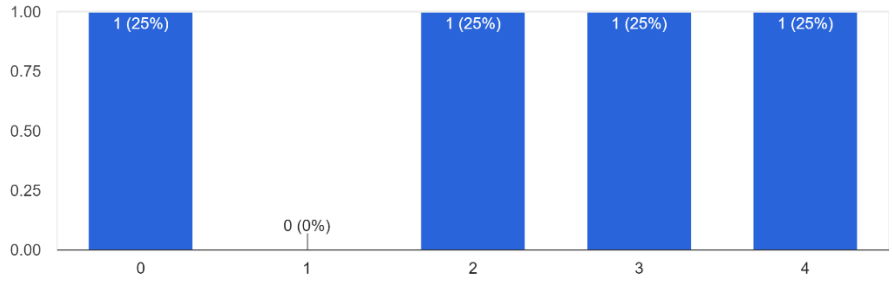
How often do you administer prescribed pharmacological pain relief to adolescents before IV placement?

4 responses



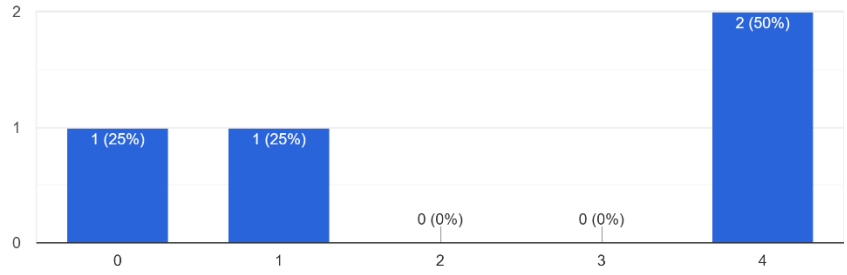
How effective do you perceive pharmacological interventions to be for managing adolescent IV placement pain?

4 responses



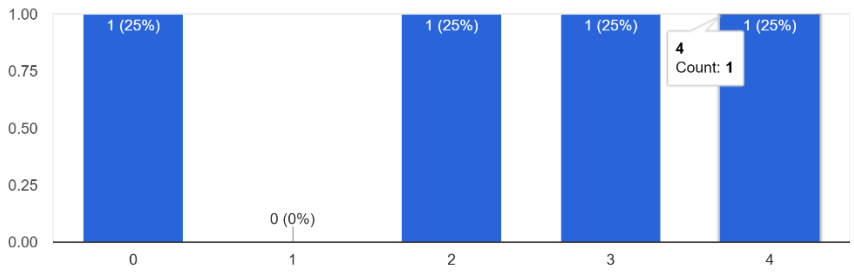
How often do you institute nonpharmacological techniques to manage adolescent IV placement pain?

4 responses



How effective do you perceive nonpharmacological interventions to be for managing adolescent IV placement pain?

4 responses

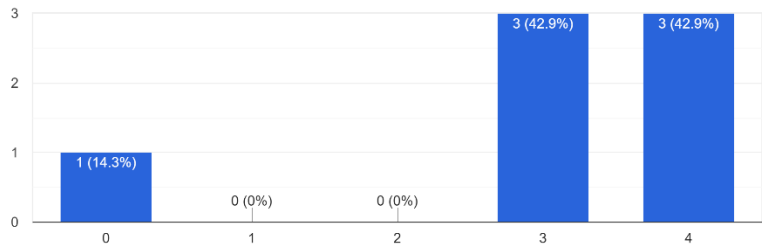


Nonpharmacological interventions: neonates and infants.

Participants were asked to rate how often they use the following techniques to provide comfort or management of pain before, during and after IV placement in neonates and infants.

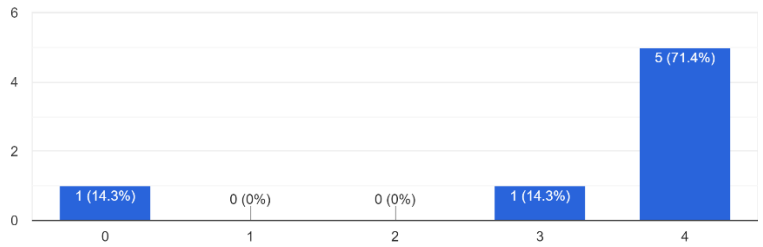
Non-nutritive sucking

7 responses



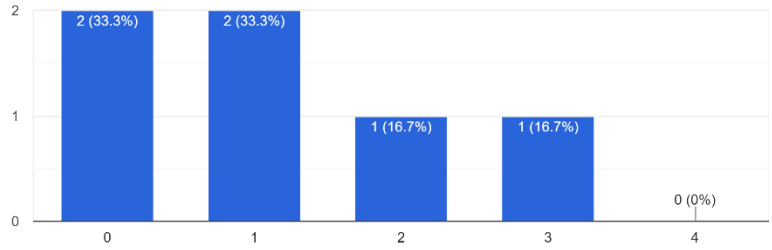
Oral Sucrose

7 responses



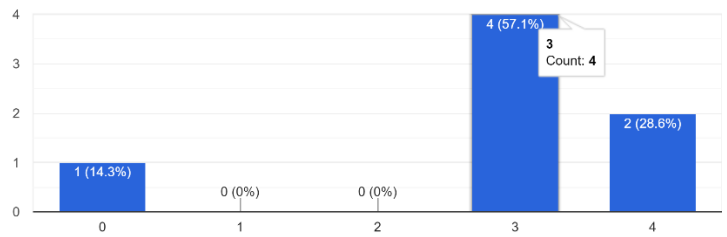
Topical anesthetic (i.e. EMLA)

6 responses



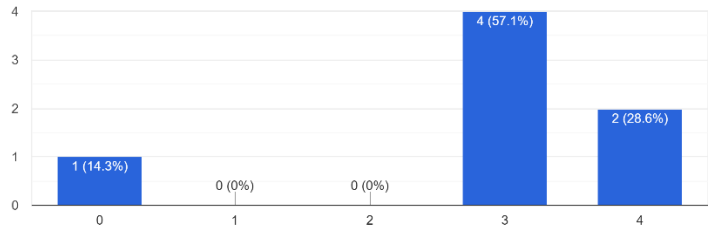
Swaddling

7 responses



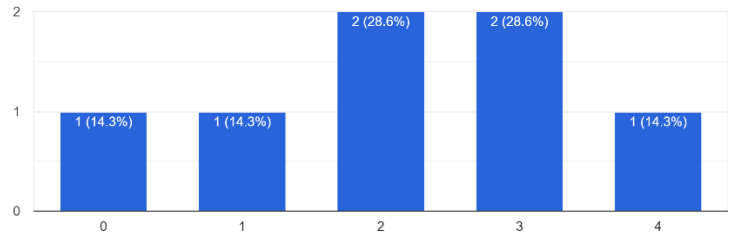
Parent involvement and touch

7 responses



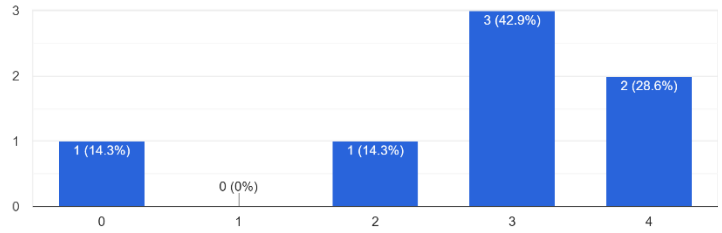
Creating a low-stimulus environment

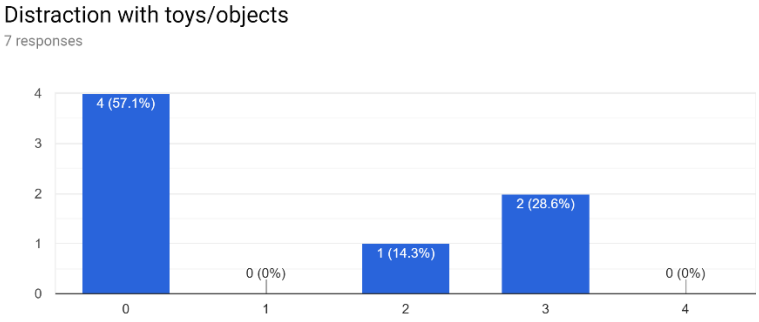
7 responses

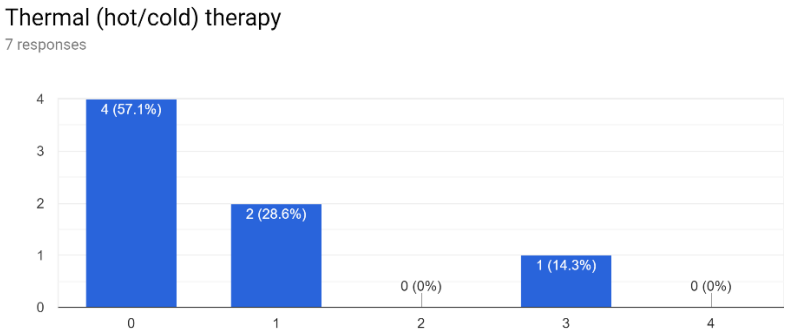


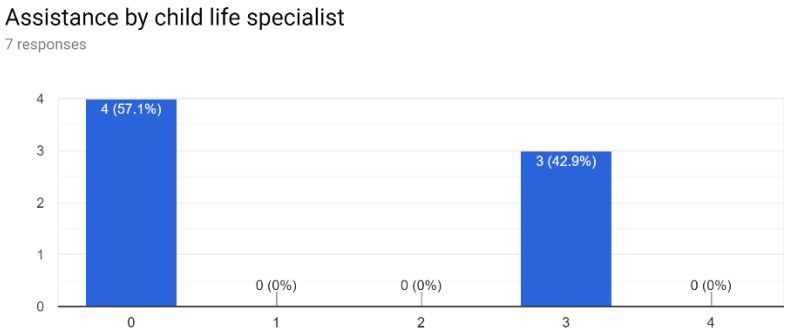
Therapeutic touch

7 responses







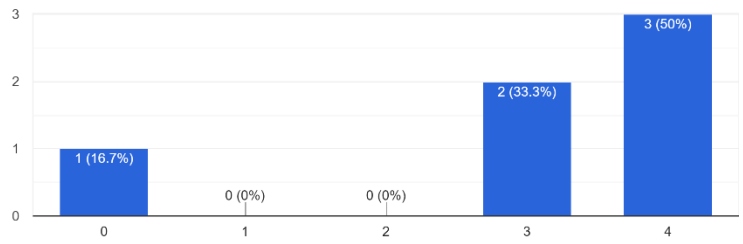


Nonpharmacological interventions: toddlers and preschoolers.

Participants were asked to rate how often they use the following techniques to provide comfort or management of pain before, during and after IV placement in toddlers and preschoolers.

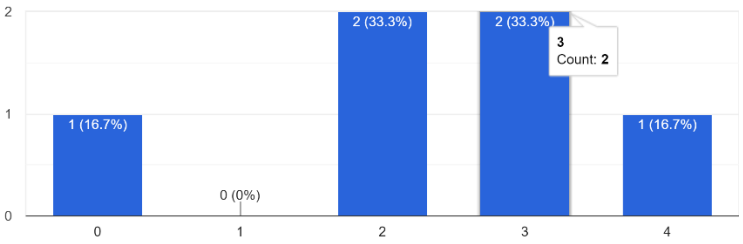
Parent involvement and touch

6 responses



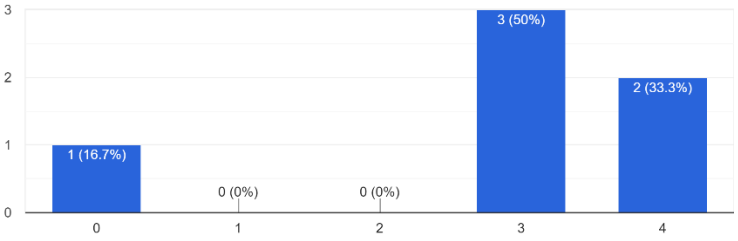
Creating a low stimulus environment

6 responses



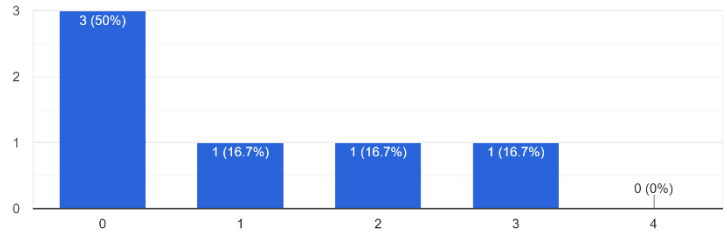
Distraction with toys/technology

6 responses



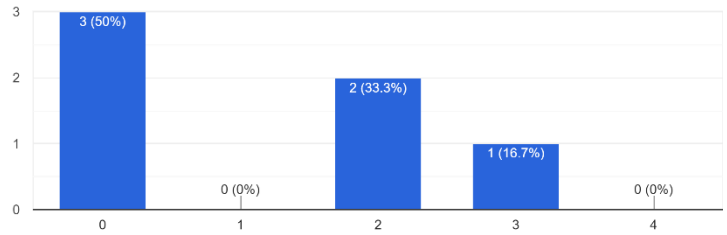
Thermal (hot/cold) therapy

6 responses



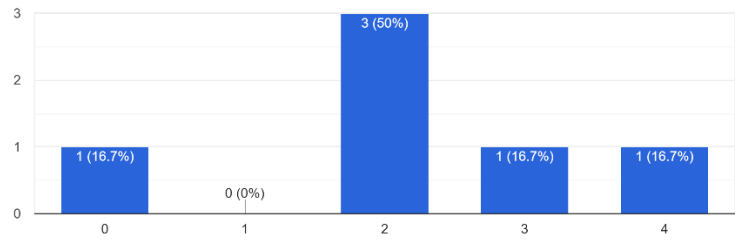
Vibration (i.e. Buzzy Bee ®)

6 responses



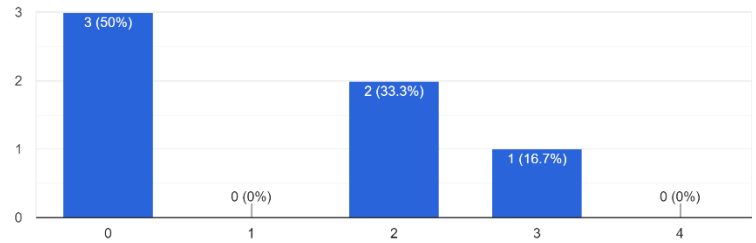
Topical anesthetic (i.e. EMLA)

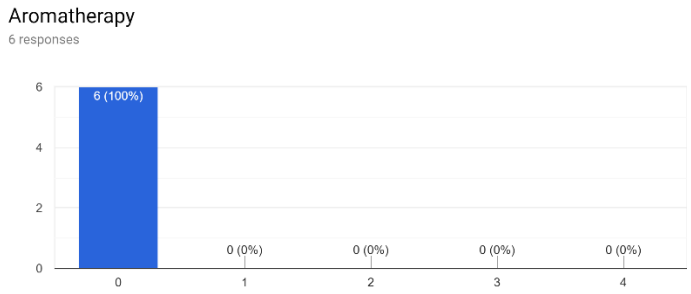
6 responses

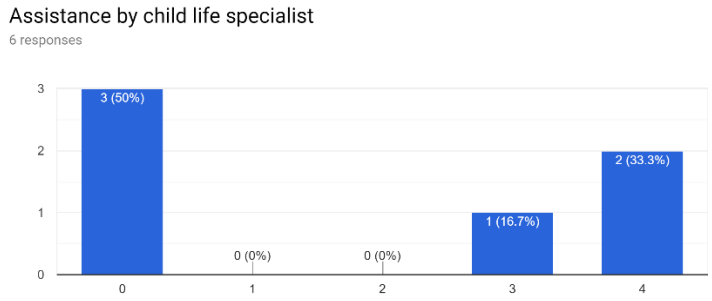


Music therapy

6 responses

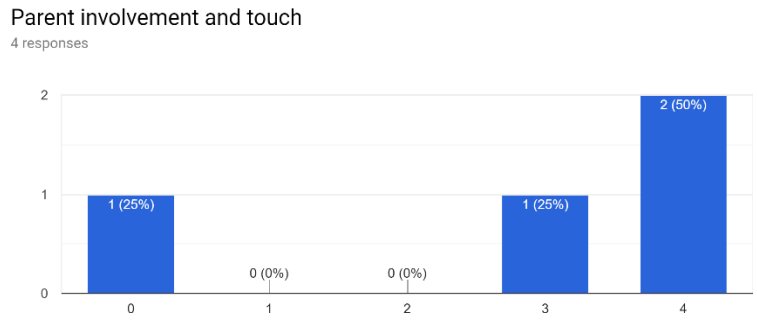






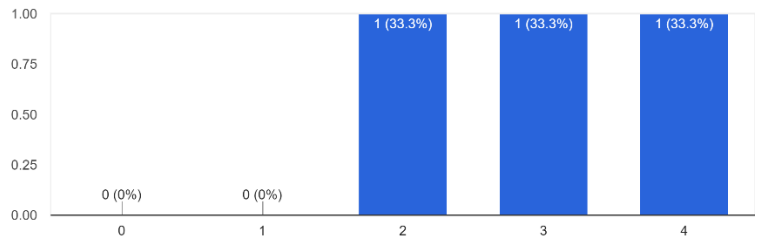
Nonpharmacological interventions: school-age children.

Participants were asked to rate how often they use the following techniques to provide comfort or management of pain before, during and after IV placement in school-aged children.



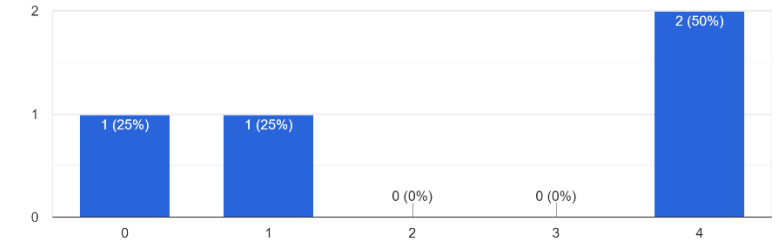
Creating a low stimulus environment

3 responses



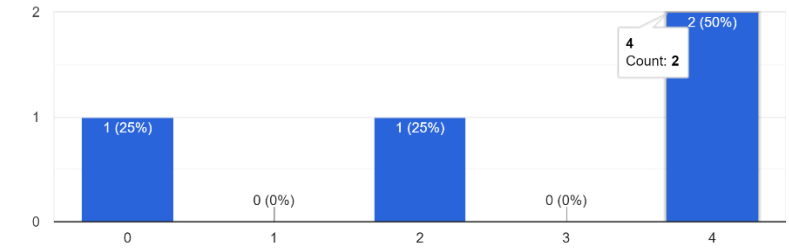
Distraction with toys/technology

4 responses



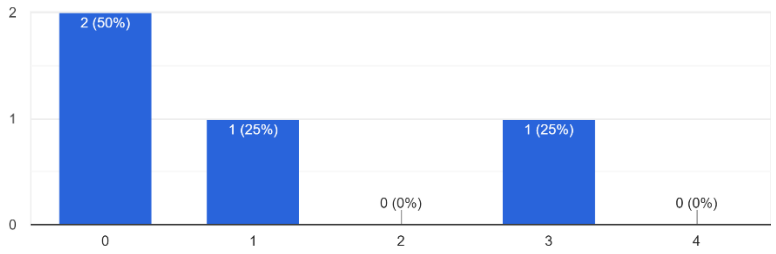
Distraction with audiovisuals (i.e. TV)

4 responses



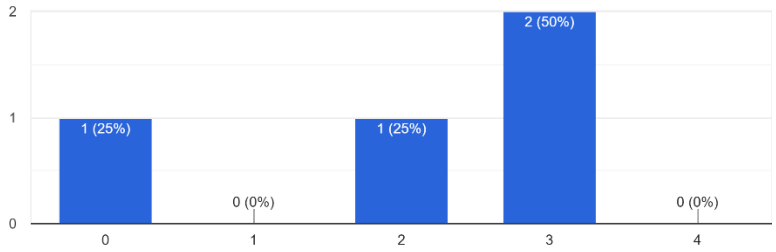
Thermal (heat/cold) therapy

4 responses



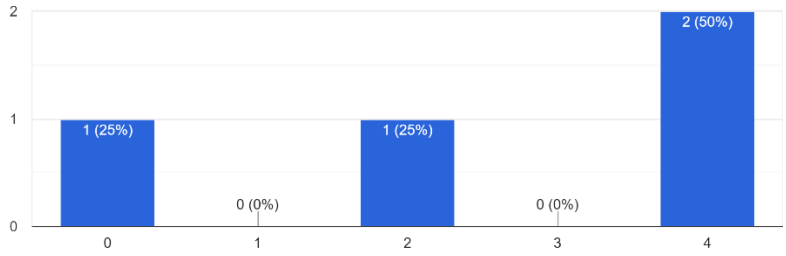
Vibration (i.e. Buzzy Bee ®)

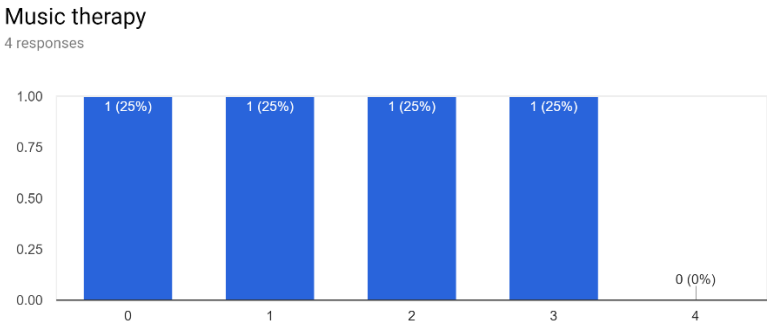
4 responses

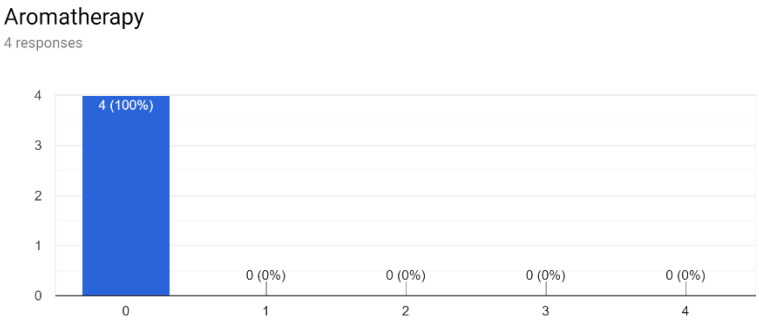


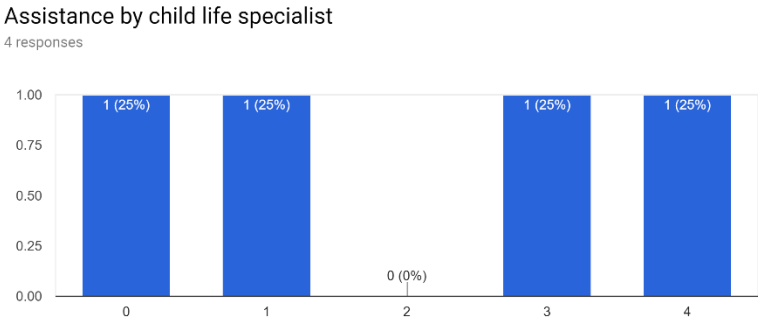
Topical anesthetic (i.e. EMLA)

4 responses







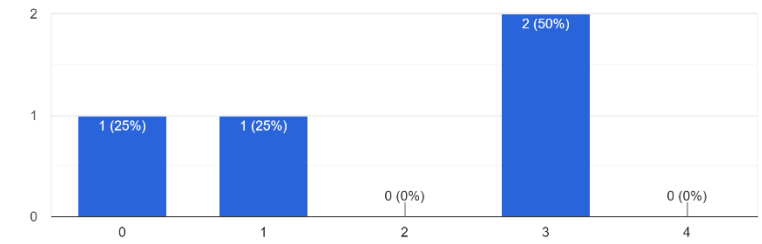


Nonpharmacological interventions: adolescents.

Participants were asked to rate how often they use the following techniques to provide comfort or management of pain before, during and after IV placement in adolescents.

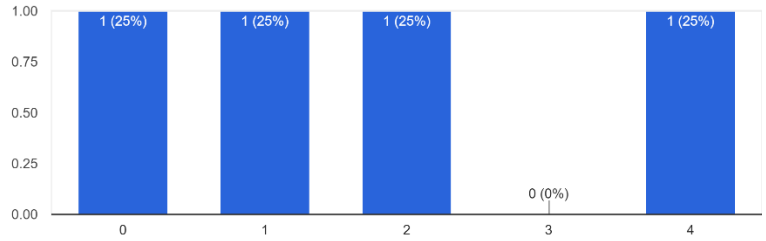
Parent involvement and touch

4 responses



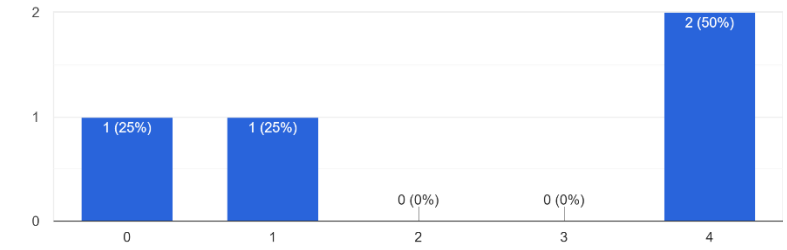
Creating a low stimulus environment

4 responses



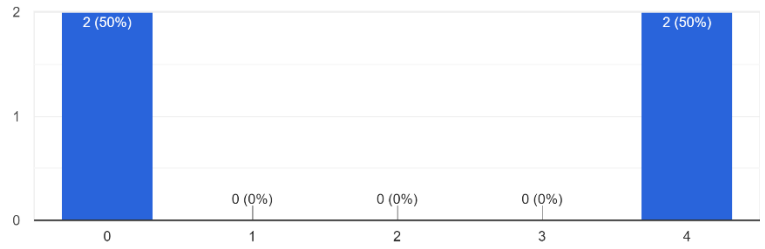
Distraction with games / technology

4 responses



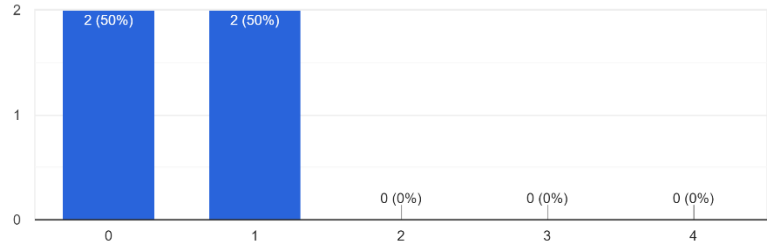
Distraction with audiovisuals (i.e. TV)

4 responses



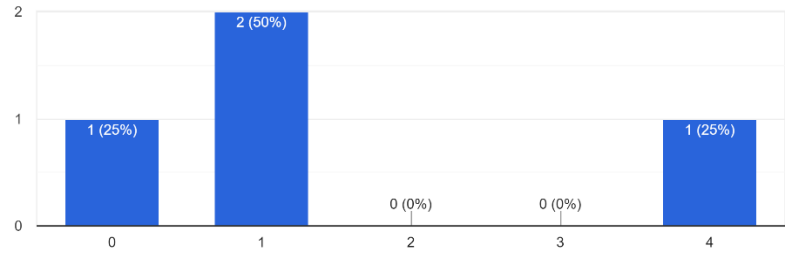
Thermal (heat/cold) therapy

4 responses



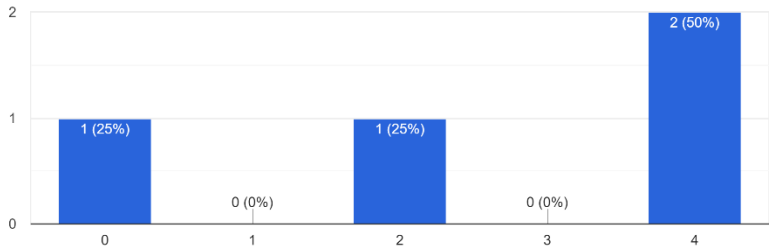
Vibration (i.e. Buzzy Bee ®)

4 responses



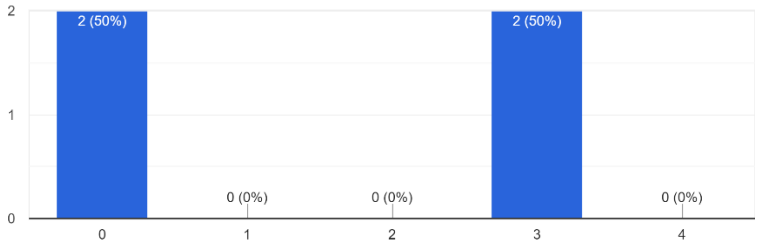
Topical anesthetic (i.e. EMLA)

4 responses



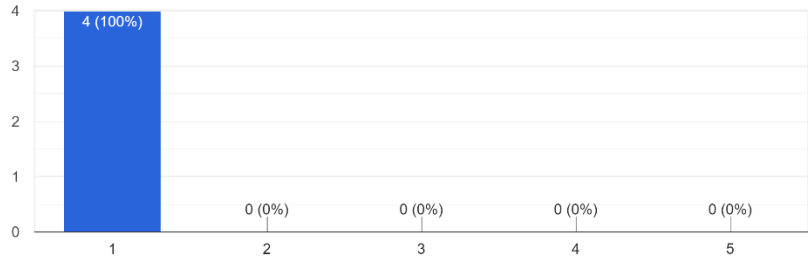
Music therapy

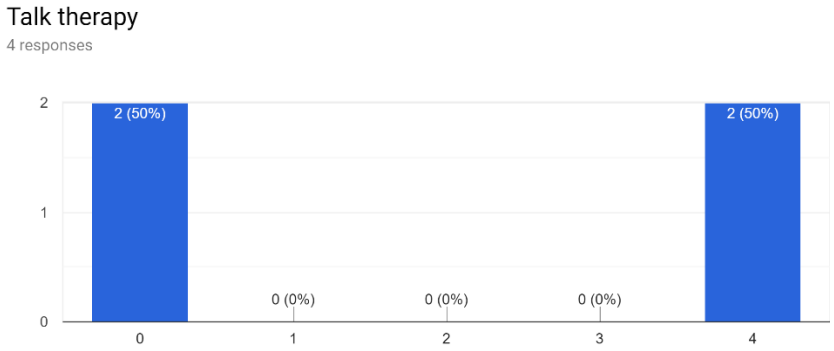
4 responses

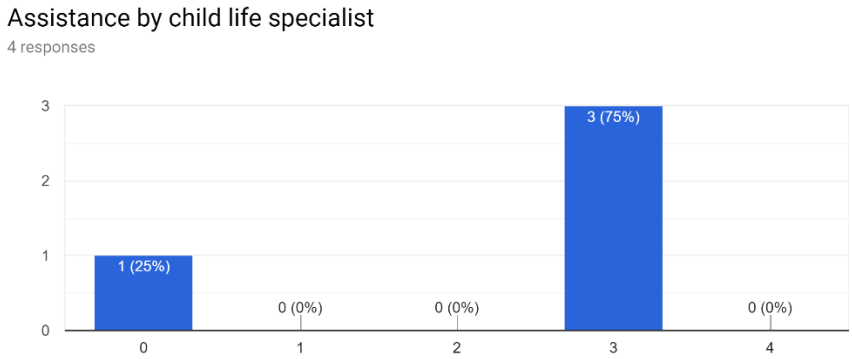


Aromatherapy

4 responses







Discussion

Perceived Pain

The participants were asked to rate how much pain they believe a child of each developmental stage experiences when receiving IV placement. Based on the Likert scale that was used, all the scores were averaged. Neonates and infants received an average score of 2.71, toddlers and preschoolers received a score of 2.83, school-aged children had an average of 3.33 and adolescents averaged 2.66. Neonates and infants and adolescents received the lowest scores meaning nurses perceive children of these age groups to experience the least amount of pain. School-aged children received the highest score meaning nurses perceive these children to experience the most amount of pain. School-aged children may be more verbal, expressive, and

active regarding pain and associated symptoms; thus nurses may perceive these children to experience higher levels of pain. This data brings awareness to the issue that the child on the very young and old spectrum may not be thought to experience high levels of pain during IV placement. Nurses may perceive infants to experience less pain because infants are generally non-verbal and are unable effectively express pain. Similarly, adolescents may choose to not speak up about pain.

Pharmacological Intervention and Effectiveness

The participants were asked to rate how often they administer prescribed pain medication for IV placement and to rate how effective they perceive the medication to be in relieving pain. For frequency of pharmacological intervention, neonates and infants received an average score of 3, toddlers and preschoolers received a score of 3.60, school-aged children had a score of 3 and adolescents also averaged 3. The scores are relatively consistent but nurses rate implementing the most pharmacological interventions within the toddler and preschooler age group.

Similarly, the scores of pharmacological effectiveness were also consistent. Neonates and infants had an average score of 3.16, toddlers and preschoolers averaged 3, school-aged children received a score of 3 and adolescents also scored 3. This means that nurses perceive pharmacological interventions to be moderately effective in all developmental age groups, with a slightly higher effectiveness in the neonate and infant age group.

Non-Pharmacological Intervention and Effectiveness

Additionally, the participants were asked to rate how often they institute non-pharmacological interventions for IV placement pain and how effective they perceive these interventions to be in managing pain. Neonates and infants averaged the highest score of 3.83.

Toddlers and preschoolers received a score of 3.80. While school-aged children received a score of 3.30 and adolescents received a 3. Overall, the participants rated using non-pharmacological interventions more frequently than pharmacological interventions in all age groups except for interventions.

However, the effectiveness of non-pharmacological interventions were perceived to be less effective in managing pain than pharmacological interventions. Neonates and infants averaged a score of 3 in this category. Toddlers and preschoolers averaged 2.60. School-aged children received 2.66 average and adolescents averaged 3. This data suggests that toddlers, preschoolers, and school-aged children are the least responsive to non-pharmacological pain management interventions.

Non-pharmacological Intervention Methods

Multiple non-pharmacological interventions were listed under each developmental stage and the participants were asked to report the frequency of each intervention's usage during IV placement pain management. The most common interventions used with neonates and infants was non-nutritive sucking and oral sucrose. For toddlers, preschoolers and school-aged children, the most commonly reported interventions were parent involvement and distraction with toys or audiovisual materials. Finally, distraction and assistance by a Child Life specialist were rated as the most common interventions for adolescents. The interventions instituted the least across all age groups were thermal therapy and aromatherapy.

Limitations

Multiple limitations exist for this study. First, a limited number of subjects and data points were obtained so the population could not be accurately represented. Additionally, the nurses selected represented specific groups, such as those associated with Dominican University,

so responses cannot be generalized to represent the entire population. Second, the tool for this study had not been previously tested so the tool may not be completely reliable. Finally, a nurse's perception and management of pain is subjective and possibly inconsistent. The lack of objective and consistent information could contribute to varied results that do not represent the general population.

Implications for Nursing Practice

This literature review and pilot study suggests that pain management during IV placement in pediatrics is a continual problem that affects children of all age groups. The data from the pilot study suggests that infants and adolescents are judged by nurses to experience less pain than toddlers, preschoolers, and school-aged children. Even though the data is limited and only suggestive, this study leads to the suggestion that nurses should assess personal thoughts and judgements of specific age groups and understand that children of different age groups may have varied responses to the same painful stimuli, such as IV placement.

Suggestions for Further Research

More research needs to be conducted on the topic of pediatric pain management during IV placement. Despite the current research, knowledge and awareness about this topic, children of all ages continue to suffer from potentially manageable procedural pain in the acute care setting. Further research should focus on each specific age groups and assess, in depth, the most effective combination of interventions to manage a child's pain. Additionally, research should be conducted on the barriers to managing pediatric pain in order to address the root cause of this issue. Proper pain management is a continual, multifactorial issue. With further research, targeted education, and increased education, this problem can be effectively addressed.

References

Bahorski, J. S., Hauber, R. P., Hanks, C., Johnson, M., Mundy, K., Ranner, D., . . . Gordon, G. (2015). Mitigating procedural pain during venipuncture in a pediatric population: A randomized factorial study. *International Journal of Nursing Studies, 52*(10), 1553-1564. doi:10.1016/j.ijnurstu.2015.05.014

Beecham, E., Howard, R., Mcculloch, R., Candy, B., Laddie, J., Rees, H., . . . Jones, L. (2015). Pharmacological interventions for pain for life-limiting conditions in children and adolescents. *Cochrane Database of Systematic Reviews,* (3). doi:10.1002/14651858.cd010750

Bergomi, P., Scudeller, L., Pintaldi, S., & Molin, A. D. (2018). Efficacy of Non-pharmacological Methods of Pain Management in Children Undergoing Venipuncture in a Pediatric Outpatient Clinic: A Randomized Controlled Trial of Audiovisual Distraction and External Cold and Vibration. *Journal of Pediatric Nursing, 42*. doi:10.1016/j.pedn.2018.04.011

Bice, A. A., Gunther, M., & Wyatt, T. (2014). Increasing Nursing Treatment for Pediatric Procedural Pain. *Pain Management Nursing*, *15*(1), 365-379. doi:10.1016/j.pmn.2012.06.004

Birnie, K. A., Chambers, C. T., Fernandez, C. V., Forgeron, P. A., Latimer, M. A., Mcgrath, P. J., . . . Finley, G. A. (2014). Hospitalized Children Continue to Report Undertreated and Preventable Pain. *Pain Research and Management, 19*(4), 198-204. doi:10.1155/2014/614784

Czarnecki, M. L., Turner, H. N., Collins, P. M., Doellman, D., Wrona, S., & Reynolds, J. (2011). Procedural Pain Management: A Position Statement with Clinical Practice Recommendations. *Pain Management Nursing,12*(2), 95-111. doi:10.1016/j.pmn.2011.02.003

Katende, G., & Mugabi, B. (2015). Comforting strategies and perceived barriers to pediatric pain management during IV line insertion procedure in Uganda's national referral hospital: A descriptive study. *BMC Pediatrics, 15*(1). doi:10.1186/s12887-015-0438-0

Kolcaba, K. Y. (1994). A theory of holistic comfort for nursing. *Journal of Advanced Nursing, 19,* 1178-1184.

Lohman, D., Schleifer, R., & Amon, J. (2010). Access to pain treatment as a human right. BMC Medicine, 8.

Manworren, R. C., & Stinson, J. (2016). Pediatric Pain Measurement, Assessment, and Evaluation. *Seminars in Pediatric Neurology, 23,* 189-200.

Marshall, C., Forgeron, P., Harrison, D., & Young, N. L. (2018). Exploration of nurses pediatric pain management experiences in rural hospitals: A qualitative descriptive study. *Applied Nursing Research, 42,* 89-97. doi:10.1016/j.apnr.2018.06.009

Palmer, G. M. (2016). Pain management in the acute care setting: Update and debates. *Journal of Paediatrics and Child Health, 52*(2), 213-220. doi:10.1111/jpc.13134

Short, S., Pace, G., & Birnbaum, C. (2017). Nonpharmacologic Techniques to Assist in Pediatric Pain Management. *Clinical Pediatric Emergency Medicine, 18*(4), 256-260. doi:10.1016/j.cpem.2017.09.006

Stanley, M., & Pollard, D. (2013). Relationship Between Knowledge, Attitudes, and Self-Efficacy of Nurses In the Management of Pediatric Pain. *Pediatric Nursing, 39(4),* 165-171.

Staveski, S. L., Wu, M., Tesoro, T. M., Roth, S. J., & Cisco, M. J. (2017). Interprofessional Team's Perception of Care Delivery After Implementation of a Pediatric Pain and Sedation Protocol. *Critical Care Nurse, 37*(3), 66-76. doi:10.4037/ccn2017538

Appendix A – Research Instrument

Pediatric Pain Management During IV Placement
Nursing Care Research Survey

Thank you for taking the time to complete this survey. The data gathered from the responses will be used to answer the following research question: How do registered nurses working in the acute care setting manage pain across the developmental spectrum during IV placement in pediatric patients?

Consent is implied by agreeing to complete the survey. Participation is completely voluntary. You may withdraw from the survey at any time. Providing answers to the all of the questions is optional - you have the right to decline to answer any or all questions. The responses gathered will be used for research and educational purposes only.

Direct any questions and comments to Kate Shaffer at kate.shaffer@students.dominican.edu. Should you experience any emotional disturbance or have any concerns regarding this survey and research, contact the Dominican University faculty advisor of this study at kathleen.beebe@dominican.edu.

(1) Demographic Information

Age: Gender:	Current workplace(s):
Nursing license (i.e. LVN, RN, NP):	Hours worked per week:
Total years holding nursing license:	Nursing specialty (i.e. Pediatrics, Trauma):
Highest degree awarded: *Circle one* Associate Bachelor Master Doctorate	Nursing floor/unit currently working on (i.e. PICU, Med-Surg, Rehab):

Where did you receive the majority of your education on pediatric pain management?

_____

_____

_____

The survey is divided into the following sections: (2) Nursing Perceptions, (3) Neonatal and Infant Care, (4) Toddler and Preschooler Care, (5) School-Aged Child Care, and (6) Adolescent Care.

Circle one number on each scale to answer each question.

(2) Nursing Perceptions

1| How much pediatric IV placement training did you receive before beginning work at your current position?

0 [none] 1 [limited] 2 [some] 3 [moderate] 4 [extensive]

2| How much education have you received regarding pediatric procedural pain management?

0 [none] 1 [limited] 2 [some] 3 [moderate] 4 [extensive]

3| How important do you believe it is to manage a child's pain during IV placement?

0 [not] 1 [somewhat] 2 [moderately] 3 [very] 4 [extremely]

4| Do you have time to implement pain reliving measures before and during IV placement?

0 [no] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

(3) Neonates and Infants

1| How often do you perform IV placement on neonates and infants?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [very frequently]

*If you selected "0 [never]" for this question, please disregard the rest of the questions in this section and proceed to section: (4) Toddlers and Preschoolers.

2| How much pain do you believe neonates and infants experience during IV placement?

0 [none] 1 [limited] 2 [mild] 3 [moderate] 4 [extreme]

3| How often do you administer prescribed pharmacological pain relief to infants and neonates before or during IV placement?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

4| How effective do you perceive pharmacological interventions to be for managing neonatal and infant IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

5|How often do you institute nonpharmacological techniques to manage neonatal and infant IV placement pain?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

6| How effective do you perceive nonpharmacological interventions to be for managing neonatal and infant IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

7| Please rate how often you use the following techniques to provide comfort and/or manage pain before, during, and/or after neonatal and infant IV placement.

0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Always

INTERVENTION	RATING (0 – 4)
Non-nutritive sucking	
Oral sucrose	
Swaddling	
Encouraging parent involvement and touch	
Creating a low-stimulus environment	
Therapeutic touch	
Distraction with toys/objects	

Heat-cold therapy	
Assistance by child life specialist	
Other (please describe)	

(4) Toddlers and Preschoolers

1| How often do you perform IV placement on toddlers and preschoolers?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [very frequently]

*If you selected "0 [never]" for this question, please disregard the rest of the questions in this section and proceed to section: (5) School-Aged Children

2| How much pain do you believe toddlers and preschoolers experience during IV placement?

0 [none] 1 [limited] 2 [mild] 3 [moderate] 4 [extreme]

3| How often do you administer prescribed pharmacological pain relief to toddlers and preschoolers before IV placement?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

4| How effective do you perceive pharmacological interventions to be for managing toddler and preschooler IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

5|How often do you institute nonpharmacological techniques to manage toddler and preschooler IV placement pain?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

6| How effective do you perceive nonpharmacological interventions to be for managing toddler and preschooler IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

7| Please rate how often you use the following techniques to provide comfort and/or manage pain before, during, and/or after toddler and preschooler IV placement.

0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Always

INTERVENTION	RATING (0 – 4)
Encouraging parent involvement and touch	
Creating a low stimulus environment	
Distraction with toys / technology	
Distraction with audiovisuals (i.e. TV)	
Heat-cold therapy	
Vibration (i.e. Buzzy Bee ®)	
Music therapy	
Aromatherapy	
Assistance by child life specialist	
Other (please describe)	

(5) School-Aged Children

1| How often do you perform IV placement on school-aged children?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [very frequently]

*If you selected "0 [never]" for this question, please disregard the rest of the questions in this section and proceed to section: (6) Adolescents.

2| How much pain do you believe school-aged children experience during IV placement?

0 [none] 1 [limited] 2 [mild] 3 [moderate] 4 [extreme]

3| How often do you administer prescribed pharmacological pain relief to school-aged children before IV placement?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

4| How effective do you perceive pharmacological interventions to be for managing school-aged children IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

5|How often do you institute nonpharmacological techniques to manage school-aged IV placement pain?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

6| How effective do you perceive nonpharmacological interventions to be for managing school-aged child IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

7| Please rate how often you use the following techniques to provide comfort and/or manage pain before, during, and/or after school-aged child IV placement.

0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Always

INTERVENTION	RATING (0 – 4)
Encouraging parent involvement and touch	
Creating a low-stimulus environment	
Distraction with toys / technology	
Distraction with audiovisuals (i.e. TV)	
Heat-cold therapy	
Vibration (i.e. Buzzy Bee ®)	
Music therapy	
Aromatherapy	
Assistance by child life specialist	
Other (please describe)	

(6) Adolescents

1| How often do you perform IV placement on adolescents?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [very frequently]

*If you selected "0 [never]" for this question, please disregard the rest of the questions in this section.

2| How much pain do you believe adolescents experience during IV placement?

0 [none] 1 [limited] 2 [mild] 3 [moderate] 4 [extreme]

3| How often do you administer prescribed pharmacological pain relief to adolescents before IV placement?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

4| How effective do you perceive pharmacological interventions to be for managing adolescent IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

5|How often do you institute nonpharmacological techniques to manage adolescent IV placement pain?

0 [never] 1 [rarely] 2 [occasionally] 3 [often] 4 [almost always]

6| How effective do you perceive nonpharmacological interventions to be for managing adolescent IV placement pain?

0 [not effective] 1 [rarely] 2 [sometimes] 3 [usually] 4 [always]

7| Please rate how often you use the following techniques to provide comfort and/or manage pain before, during, and/or after adolescent venipuncture.

0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Always

INTERVENTION	RATING (0 – 4)
Encouraging parent involvement and touch	
Creating a low stimulus environment	
Distraction with games / technology	
Distraction with audiovisuals (i.e. TV)	
Heat-cold therapy	
Vibration (i.e. Buzzy Bee ®)	
Music therapy	
Aromatherapy	
Talk therapy	
Assistance by child life specialist	
Other (please describe)	